Digestibility and metabolizable energy of selected tropical feedstuffs estimated by *in vitro* and prediction equations

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Introduction

- Organic matter digestibility (dOM) and metabolizable energy (ME) content are decisive for the nutritional quality of feeds.
- *In vivo* determination of dOM and ME is best, but is laborious and expensive.
- Nutrient analysis is routine, fast ,and cheap, but correlations with *in vivo* data are mixed.

Objectives

1. Determine nutritive quality of locally used tropical feedstuffs in Lower Nyando, Kenya.
2. Compare dOM and ME of such feedstuffs using *in vitro* gas production method and some published equations.

Materials and methods

- 60 households in 20 villages in Lower Nyando (Feb'14 - May'15).
- 75 pasture herbage and 46 other feedstuffs samples
- Nutrient analysis and *in vitro* incubations.
- Multiple comparison of dOM and ME values from different methods.

Results

Table 1: Proximate composition of selected ruminant feedstuffs used in Lower Nyando, Western Kenya (Mean ± SEM).

		DM	CA	NDF	ADF	CP	EE	dOM	GE	ME
Feedstuff	**n**	g/100 g FM	g/100 g DM					g/100g OM	MJ/kg DM	
Pasture herbage	44	33 ± 2.6	10 ± 0.3	63 ± 0.5	32 ± 0.5	11 ± 0.4	1.2 ± 0.2	55 ± 0.5	17 ± 0.1	7.1 ± 0.42
Sugarcane tops	3	81 ± 3.0	5 ± 0.1	72 ± 0.4	39 ± 0.4	4 ± 0.1	0.6*	43*	17 ± 0.3	5.9*
Napier grass	5	20 ± 0.5	17 ± 0.6	65 ± 0.3	37 ± 0.2	8 ± 0.2	0.7*	59*	14 ± 0.1	7.0*
Sweet potato vines	3	26 ± 1.6	10 ± 0.2	41 ± 0.5	28 ± 0.2	10 ± 0.2	1.9*	65*	17 ± 0.1	8.9*
Mixed browsed leaves	16	38 ± 3.0	7 ± 0.6	37 ± 1.0	26 ± 0.7	14 ± 0.6	2.2*	53*	19 ± 0.2	7.0*
Banana stalks	6	9 ± 2.4	11 ± 1.0	66 ± 2.0	38 ± 2.3	3 ± 0.3	0.8*	54*	15 ± 0.3	7.1*
Banana leaves	3	14 ± 1.5	16 ± 0.4	56 ± 0.6	35 ± 1.1	11 ± 1.0	4.5*	42*	17*	4.3*
Balanite aegyptiaca leaves	2	48 ± 8.4	7 ± 0.5	59 ± 0.9	40 ± 0.9	8 ± 0.6	0.8*	43*	19*	5.5*
Rice stover, husks	1	88*	11*	69*	36*	4*	0.6*	48*	17*	6.1*
Mangifera indica leaves	1	48*	15*	37*	27*	6*	2.4*	44*	16*	4.8*

ADF, acid detergent fiber; CA, crude ash; CP, crude protein; DM, dry matter; dOM, digestible organic matter; EE, ether extract; FM, fresh matter; GE, gross energy; ME, metabolizable energy; NDF, neutral detergent fiber; SEM, standard error of the mean.
* Samples were pooled to give one sample each (i.e., calculation of SEM not possible).

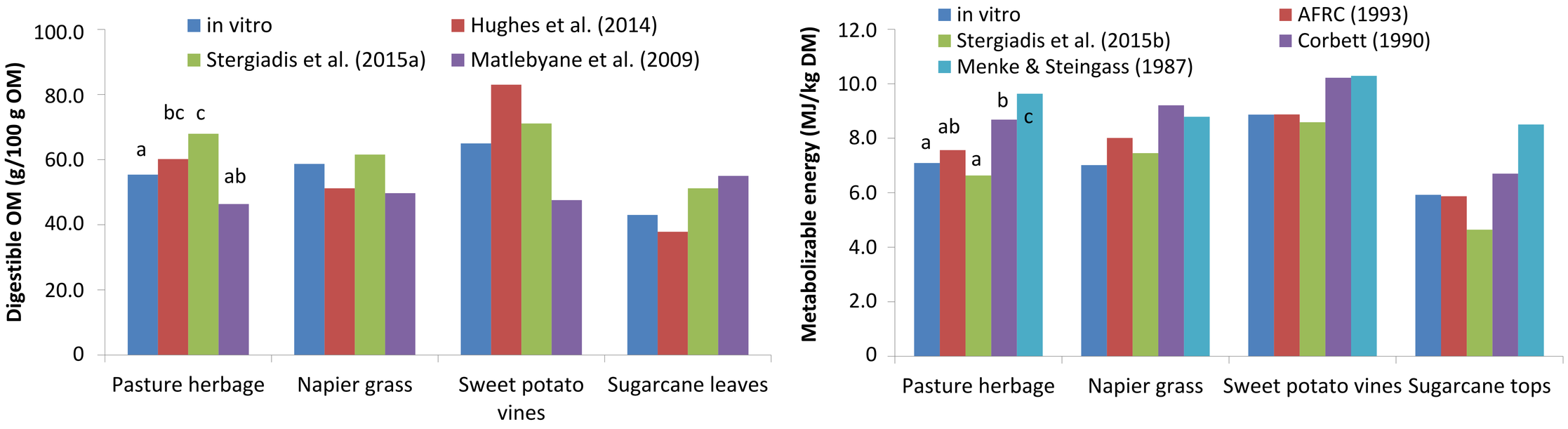

Figure 1: Comparison of a) digestible organic matter (OM) and b) metabolizable energy as estimated from *in vitro* gas production or some published prediction equations for ruminant feedstuffs in Lower Nyando, Western Kenya.

Discussion and conclusions

- Nutrient concentrations were highly variable here and in literature maybe due to, amongst others, differences in climate, soil fertility, pasture species composition, and stage of maturity.
- The CP, dOM, and ME for pasture herbage, Napier grass ,and sweet potato vines were of moderate nutritional value for ruminants.
- The prediction equations for dOM yielded similar results, that were however, always higher *in vitro* estimates for pasture herbage which may be, for instance, a result of the presence of anti-nutritional factors.
- Equation-derived estimates of ME from dOM were similar as opposed to those from chemical parameters alone.
- There is need for further characterization of tropical feeds and region-specific equations for prediction dOM or ME.

Selected references

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